Abstract:

This paper was prepared to derive a correlation by comparing and analyzing U.S. outdoor public air data (OAD) and indoor air data (IAD). While the importance of air quality has become more prominent since the COVID-19 pandemic, modern people are based only on data on outdoor air quality, even though they live indoors more than 80% a day, and are not aware of how different the actual indoor air quality is from outdoor air quality. That is, it can be said that the general public's interest in indoor air quality is weaker than that of outdoor air quality. In this paper, we directly measure U.S. indoor air data using Arduino, Raspberry Pie, and various sensors and conduct a comparative analysis with outdoor air data provided by the government and institutions to derive correlations. Through this, it visualizes and presents how much difference occurs in indoor air from the outdoor air.

Introduction:

Air pollution, such as yellow dust and fine dust, is a problem that all countries and institutions are trying to solve in modern society. The importance of air quality is a fact that everyone knows well. In addition, the importance of air quality has become more prominent since the COVID-19 pandemic. The U.S. Centers for Disease Control and Prevention (CDC) officially recognizes air transmission as a major transmission route for COVID-19, and the World Health Organization (WHO) also includes air transmission as a COVID-19 transmission route.

With the above importance, many people check outdoor air quality data (fine dust and ultrafine dust concentrations) provided by the government or provided by each institution every day before starting their daily routine. Nevertheless, it can be said that the general public's interest in indoor air quality is weaker than that of outdoor air quality.

According to the U.S. Environmental Protection Agency, indoor air, where modern people live more than 80% to 90% of the day, is 100 times more polluted than outside air; and a study also suggested that indoor air pollutants are 100 times more likely to be delivered to human lungs than air pollutants. The American Lung Association (ALA) also announced that indoor harmful substances are two to five times more than outdoor air and that there are cases of 100 times more harmful substances. Analysts say that various chemical components discharged from walls and furniture, beds, pillows, house dust, and dust caused by human movement are combined, polluting indoor air.

In this paper, we compare major indoor air pollutants and factor data provided by the Environmental Protection Agency (EPA) with data measured directly in the actual indoor environment to see how much difference there is between external air data provided by countries or institutions and actual indoor air data. Through this, it analyzes how much outdoor air such as fine dust and ultrafine dust, which people use as the basis for daily activities, correlates with indoor air that works for a long time, and presents the measurement results.

Arduino and raspberry pi, temperature and humidity sensors, fine dust sensors, and gas sensors were used as measuring devices (systems) for analyzing indoor air quality data. Data were measured and collected periodically in the same place planned time.